



# ETX-CM

## ETX Module

### User's Guide



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# 1. USER INFORMATION

## 1.1 *About This Manual*

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

## 1.2 *Unpacking*

- 1) After opening the box, save it and the packing material for possible future shipment.
- 2) Remove all items from the box. If any items listed on the purchase order are missing, notify customer service immediately.
- 3) Inspect the product for damage. If there is damage, notify customer service immediately.

## 1.3 *Warranty Policy*

### 1. Limited Warranty

Quanmax Inc.'s detailed Limited Warranty policy can be found under at *Support* at **[www.quanmax.com](http://www.quanmax.com)**. Please consult your distributor for warranty verification.

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Quanmax or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Quanmax or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's guide.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. Quanmax reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

## 2. INTRODUCTION

### 2.1 *ETX-CM*

The ETX-CM is an ETX (Embedded Technology eXtended) form factor computer-on-module combining the performance of the Intel® Pentium® M Processor (1MB L2 cache, FC-mPGA package) with the high integration of the Intel® 855GME chipset and I/O Controller Hub ICH4. Featured are a 400MHz processor system bus, and 266/333MHz DDR SODIMM up to 1GB maximum.

The ETX-CM is fully compliant with the ETX Component SBC™ Specification V2.6. This computer-on-module features a 32-bit/33MHz cPCI Bus Interface, USB v2.0, audio, serial ports, parallel port, keyboard/mouse, Ethernet, and IDE. The flexibility of the ETX computer-on-module concept allows the baseboard designer to optimize how each of these functions is physically implemented.

### 2.2 *ETX Documentation*

This product manual serves as one of three principal references for an ETX design. It documents the specifications and features of *ETX-CM* modules. The other two references include:

- The *ETX Component SBC™ Specification* defines the ETX module form factor, pinout, and signals. You should read this first.
- The *ETX Component SBC™ Design Guide* serves as a general guide for baseboard design, with a focus on maximum flexibility to accommodate a range of ETX modules.

### 2.3 *ETX Benefits*

Embedded technology extended (ETX) modules are very compact (~100mm square, 12mm thick), highly integrated computers. All ETX modules feature a standardized form factor and a standardized connector layout that carry a specified set of signals. This standardization allows designers to create a single-system baseboard that can accept present and future ETX modules.



ETX modules include common personal computer (PC) peripheral functions such as:

- Graphics
- Parallel, Serial, and USB ports
- Keyboard/mouse
- Ethernet
- Sound
- IDE

The baseboard designer can optimize exactly how each of these functions implements physically. Designers can place connectors precisely where needed for the application on a baseboard designed to optimally fit a system's packaging.

Peripheral PCI or ISA buses can be implemented directly on the baseboard rather than on mechanically unwieldy expansion cards. The ability to build a system on a single baseboard using the computer as one plug-in component simplifies packaging, eliminates cabling, and significantly reduces system-level cost.

A single baseboard design can use a range of ETX modules. This flexibility can differentiate products at various price/performance points, or to design future proof systems that have a built-in upgrade path. The modularity of an ETX solution also ensures against obsolescence as computer technology evolves. A properly designed ETX baseboard can work with several successive generations of ETX modules.

An ETX baseboard design has many advantages of a custom, computer-board design but delivers better obsolescence protection, greatly reduced engineering effort, and faster time to market.

## 3. SPECIFICATIONS

### 3.1 *Functional Specifications*

- Processor:
  - Intel® Pentium® M Processor 478 µFC-PGA
  - Intel® Celeron® M Processor 478 µFC-PGA
- Chipset:
  - Intel® 855GME Graphic Memory Controller Hub (GMHC)
  - Intel® I/O Controller Hub 4 (ICH4)
- Cache:
  - Processor option: 2MB, 1MB, or 512kB onboard L2 cache
- Bus:
  - 400 MHz system bus
- Memory:
  - One DDR-SODIMM 266/333MHz up to 1GB
- Super I/O:
  - Winbond W83627HF
- Serial Ports
  - 2x TTL (16550 compatible),
  - IrDA support
- Parallel Port (LPT1)
  - Shared with floppy signals
  - Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP) with bi-directional capability
- Floppy (optional):
  - Shared with LPT signals
- Enhanced Intelligent Drive Electronics (EIDE):
  - Two EIDE interfaces, Ultra ATA/100, 100MB/sec
- Universal Serial Bus (USB)
  - Four USB 2.0 ports (OHCI)
- Onboard Ethernet:
  - 10BASE-T/100BASE-T LAN Controller integrated in ICH
  - Intel® 82562GT 10/100 Mbps Platform LAN Connect

- Video :
  - CRT display
  - Dual Channel 24-bit LVDS
  - TV-out
  - DVI
- Audio:
  - Integrated in ICH4
  - AC'97 Link for Audio and Telephony CODECs
- BIOS:
  - AwardBIOS PnP 4Mb Flash with console redirection
- PS/2 keyboard/mouse controller
- Watchdog timer (WDT)
- Real-time clock (requires external battery)

## 3.2 ***Mechanical Specifications***

### 2. Dimensions

- 95.0 mm x 114.0 mm (3.75" x 4.5")
- Height approx. 10.8 mm (0.43"); 12.5mm (0.49") w/ Heat Spreader

## 3.3 ***Electrical Specifications***

### 3. Supply Voltage

- 5V DC +/- 5%

### 4. Supply Voltage Ripple

- 100 mV peak to peak 0 - 20 MHz

## 5. Supply Current (typical, DOS prompt)

Power-consumption tests were executed under WinXP SP2 and with mouse and keyboard.

All tested boards were fully equipped. All boards were equipped with 256MB SDRAM. The BIOS setting for the PS/2 mouse was set to *Enabled*.

CPU Clock	Celeron® M Processor 1.3 GHz		
Mode	Full On	Idle	Suspend
Power Consumption	5.23 A	2.81 A	1.96 A

## 6. CMOS Battery Power Consumption

RTC	Voltage	Current
Winbond W83627HF	2.5V	1.8 $\mu$ A
	3.0V	2.8 $\mu$ A

CMOS battery power consumption was measured with an ETX module on a standard ETX evaluation board. The system was turned off and the battery was removed from the evaluation board. 2.5 V or 3.0 V of power was supplied using a DC power supply. These values should not be used to calculate the CMOS battery lifetime.

## 7. APM1.2 Support

The CPU clock is stopped in standby and suspend mode.

## 3.4 *Environmental Specifications*

### 8. Temperature

- Operating (with heatspreader-plate assembly):
  - Ambient temperature: 0 to +60 °C
  - Maximum heat-spreader plate temperature: 0 to +60 °C (\*)
- Nonoperating: -10 to +85 °C

See the [Thermal Management](#) chapter for additional information.

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**Note:** \* The maximum operating temperature with the heatspreader plate is the maximum measurable temperature on any spot on the heatspreader's surface. You must maintain the temperature according to the above specification.

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- Operating (without heatspreader-plate assembly):
  - Maximum operating temperature: 0 to +60 °C (\*\*)
- Nonoperating: -10 to +85 °C

See the [Thermal Management](#) chapter for additional information.

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**Note:** \*\* The maximum operating temperature is the maximum measurable temperature on any spot on a module's surface. You must maintain the temperature according to the above specification.

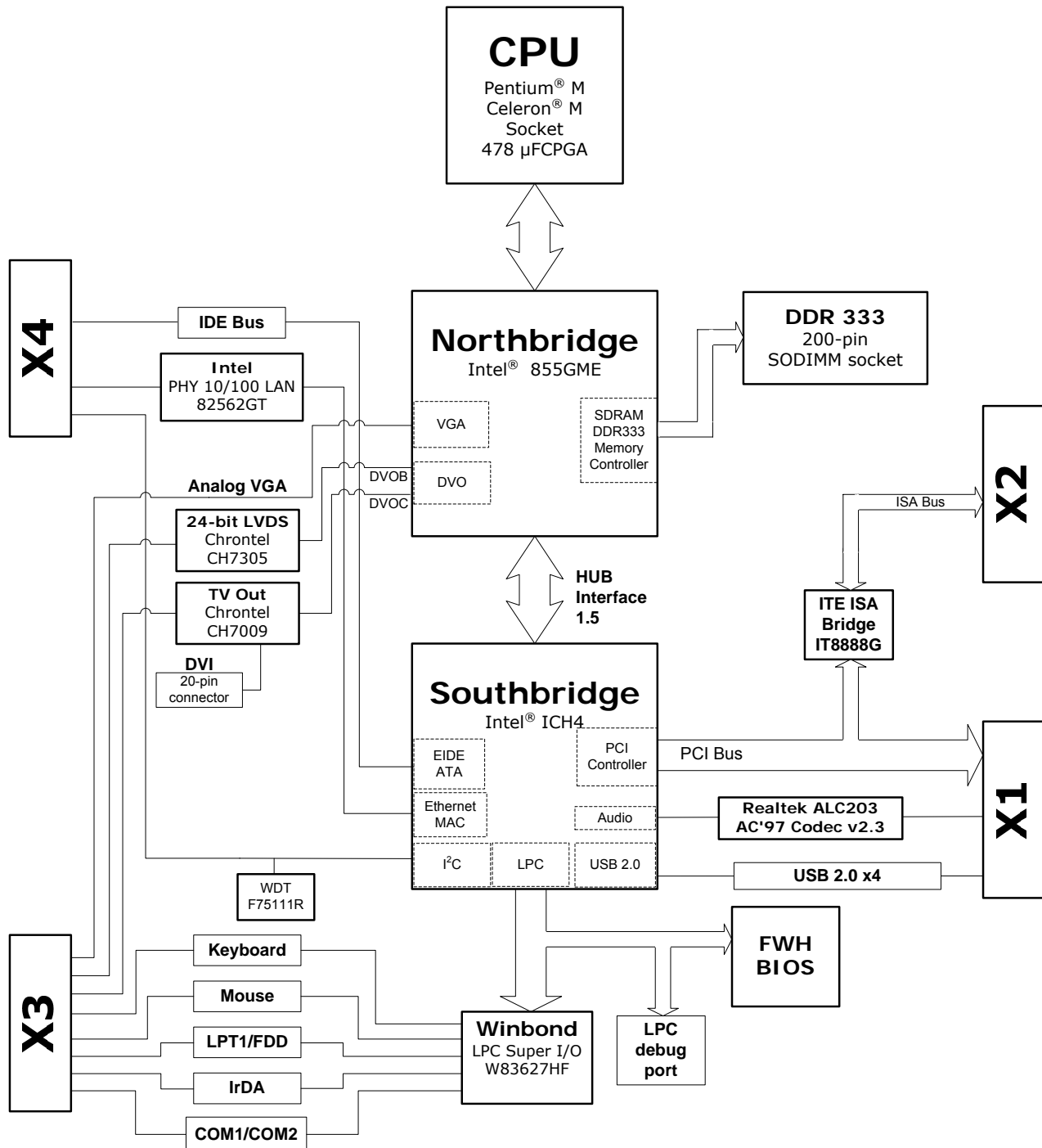
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### 9. Humidity

- Operating: 10% to 90% (noncondensing)
- Nonoperating: 5% to 95% (noncondensing)

## 4. CORE FUNCTIONS

### 4.1 Block Diagram



## 4.2 **CPU**

The ETX-CM supports a single Intel® Pentium® M or Celeron® M Processor in a 478 µFC-PGA package. The processor features:

- Supports Intel® Architecture with Dynamic Execution
- High performance, low-power core
- On-die, primary 32-kbyte instruction cache and 32-kbyte write-back data cache
- On-die, up to 2-MB L2 cache with Advanced Transfer Cache Architecture
- Advanced Branch Prediction and Data Prefetch Logic
- Streaming SIMD extensions 2(SSE2)
- 400MHz source-synchronous FSB
- Advanced Power Management features including Enhanced Intel® SpeedStep® technology

## 4.3 **Northbridge**

The Intel® 855GME GMCH features:

- 400 MHz FSB
- System memory supports 333MHz DDR-SDRAM with ECC
- Provides multiple display ports: one progressive scan analog monitor and two DVO ports (used for LVDS and DVI/TV-out)
- Direct Media Interface (DMI) between GMCH and ICH4, 2GB/s point-to-point DMI to ICH4
- Package: Micro-FCBGA, 732-pin

## 10. **System Memory Support**

- One SO-DIMM, single-sided or double-sided, with unbuffered DDR 266/333MHzSDRAM (with or without ECC)
- x8 and x16 width DDR SDRAM devices with densities of 128-Mb, 256-Mb, and 512-Mb technology.
- Maximum of 1 GB of system memory with high-density 512-Mb technology devices

## 11. Integrated Display Interface

The 855GME integrated display interface supports an analog CRT and two DVO ports (used for LVDS and DVI/TV-out).

- Analog CRT DAC
  - Supports max. DAC frequency up to 400 MHz
  - 24-bit RAMDAC support
  - DDC2B compliant
  - Up to 2048x1536 mode support @ 60Hz
- LVDS (Chrontel CH7305 via DVOB)
  - Single / Dual LVDS transmitter
  - Supports pixel rate up to 165M pixels/sec
  - Supports up to UXGA resolution (1600 x 1200)
  - LVDS low jitter PLL
  - LVDS 24-bit or 18-bit output
  - 2D dither engine for 18-bit output
  - Panel protection and power down sequencing
  - Programmable power management
  - Fully programmable through serial port
  - Complete Windows and DOS driver support
  - Variable voltage interface to graphics device
- DVI and TV-out (Chrontel CH7009 via DVOC)
  - DVI Transmitter up to 165M pixels/second
  - TV output supporting graphics resolutions up to 1024x768 pixels
  - Supports RGB and YCrCb
  - Support for all NTSC and PAL formats
  - Provides CVBS, S-Video and SCART (RGB) outputs
  - TV connection detect
  - 10-bit video DAC outputs

## 4.4 Southbridge

The **Intel® ICH4** features:

- PCI 33-bit/33MHz Bus interface
- Two parallel IDE channels support up to two devices, up to Ultra ATA-100
- Integrated LAN Controller provides 10/100 Mbit/sec Ethernet support
- Audio Interface
  - AC'97 Link for Audio and Telephony CODECs
- Four USB 2.0 ports
- SMBus 2.0 interface support
- Firmware Hub I/F supports BIOS memory size up to 8 Mbytes



- Low Pin Count (LPC) I/F supports two Master/DMA devices
- GPIO
- Enhanced DMA Controller
- Power Management Logic — ACPI 2.0 compliant
- Package: 31mm x 31mm, 421 pin BGA

## **12. PCI 32-bit Interface**

ETX-CM supports one PCI 33MHz / 32bits interface compliant to PCI Local Bus Specification, Revision 2.2. All PCI signals are 5 V tolerant. The ICH4 integrates a PCI arbiter that supports up to four external PCI bus masters in addition to the internal ICH4 requests.

## **13. IDE Controller**

The ICH4 IDE controller features two sets of interface signals (Primary and Secondary) that can be independently enabled, tri-stated or driven low. The ICH4 IDE controller supports both legacy mode and native mode IDE interface. In native mode, the IDE controller is a fully PCI compliant software interface and does not use any legacy I/O or interrupt resources. The IDE interfaces of the ICH4 can support several types of data transfers:

- Programmed I/O (PIO)
- Ultra ATA/33/66/100

## **14. USB 2.0**

The ICH4 has one EHCI high-speed USB 2.0 Host Controller that supports 4 USB 2.0 ports. Over-current detection on all USB ports is supported. USB legacy devices, such as keyboard, mouse and floppy drive are supported and can be enabled / disabled in BIOS options. In addition, USB floppy boot feature is also implemented on all USB ports.

## **15. System Management Bus (SMBus)**

The ICH4 provides an SMBus 2.0 compliant host controller as well as an SMBus Slave Interface. The Host controller provides a mechanism for the processor to initiate communications with SMBus peripherals (slaves). The ICH4 is also capable of operating in a mode in which it can communicate with I2C compatible devices. The Slave Interface allows an external master to read from or write to the ICH4. Write cycles can be used to cause certain events or pass messages, and the read cycles can be used to determine the state of various status bits.

## 4.5 ***Super I/O***

The LPC-based Winbond W83627HF Super I/O controller provides the following functionality:

- Two high-speed 16550 compatible UARTs with 16-byte send/receive FIFOs
- Support IrDA version 1.0 SIR protocol with maximum baud rate up to 115.2K bps
- Parallel Port, Floppy Drive Port, Keyboard/Mouse Controllers

## 4.6 ***On-board Watchdog Timer***

The ETX-CM implements a two-stage watchdog timer on the Fintek F75111R Low Power GPIO device.

## 4.7 ***TV Encoder / DVI Transmitter***

The Chromtel CH7009 enables the ETX-CM to support TV and DVI output.

## 4.8 ***AC'97 Codec***

The ETX-CM supports AC'97 via the Realtek ALC203, a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 compatible stereo audio CODEC designed for PC multimedia systems, including host/soft audio, and AMR/CNR based designs.

## 4.9 ***Backup Interface to BIOS***

The ETX-CM provides a backup interface to BIOS in order to give the user an opportunity to write to the flash even when the BIOS is corrupted and inaccessible for the system. Users can alter the ID of the on-board BIOS and utilize the backup BIOS on EEPROM to boot the system.

## 5. CONNECTOR X1 SUBSYSTEMS

### 5.1 *PCI Bus*

The implementation of this subsystem complies with the *ETX* Specification. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

### 5.2 *USB*

The ICH4 has one EHCI high-speed USB 2.0 Host Controller that supports 4 USB 2.0 ports. Over-current detection on all USB ports is supported.

#### **Configuration**

The USB controllers are PCI bus devices. The BIOS allocates required system resources during configuration of the PCI bus.

### 5.3 *Audio*

The ETX-CM supports AC'97 via the Realtek ALC203, a 20-bit DAC and 18-bit ADC full-duplex AC'97 2.3 compatible stereo audio CODEC designed for PC multimedia systems, including host/soft audio, and AMR/CNR based designs. The controller supports a Line In, a Line Out, and a Mic In interface.

#### **Configuration**

The audio controller is a PCI bus device. The BIOS allocates required system resources during configuration of the PCI device.

### 5.4 *3.3V Power Supply for External Components*

The *ETX-CM* offers the ability to connect 3.3V devices to the onboard generated supply voltage. Pin 12 and Pin 16 of Connector X1 are used to connect to the +3.3V  $\pm 5\%$  power supply. The maximum external load is 500mA.

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**WARNING**

Do not connect 3.3V pins to an external 3.3V supply.

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For additional information, refer to the *ETX Design Guide*.

## 6. CONNECTOR X2 SUBSYSTEMS

### 6.1 *ISA Bus Slot*

The ISA Bus is provided by the ITE IT8888G PCI-to-ISA Bridge Chip.

The implementation of this subsystem complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

## 7. CONNECTOR X3 SUBSYSTEMS

### 7.1 *VGA/LVDS Output*

The Intel® 855GME GMCH incorporates extensions to the GX1 processor's display subsystem. These include:

- VGA Graphics :
  - GMCH internal VGA controller
  - CRT: 2048x1536x8bit@60Hz resolution
  - Max. shared memory 64MB
- LCD Panel:
  - Dual Channel 24-bit LVDS via Chrontel CH7305
  - 165 Mpixels/sec
  - Max. resolution UXGA 1600x1200

#### **Configuration**

The graphics controller requires the following resources:

- An IRQ
- Several I/O addresses
- Memory-address blocks in high memory

The BIOS allocates the resources during AGP configuration. Many resources are set for compatibility with industry-standard settings.

### 7.2 *TV-Out / DVI*

The Chrontel CH7009 enables the ETX-CM to support TV and DVI output.

- DVI Transmitter up to 165M pixels/second
- TV output supporting graphics resolutions up to 1024x768 pixels
- Supports RGB and YCrCb
- Support for all NTSC and PAL formats
- Provides CVBS, S-Video and SCART (RGB) outputs
- TV connection detect
- 10-bit video DAC outputs

See Section 13.6 for DVI Connector pin definitions.

### 7.3 ***Serial Ports (1 and 2)***

The implementation of the serial-communication interface complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

#### **Configuration**

The serial-communication interface uses I/O and IRQ resources. The resources are allocated by BIOS during POST configuration and are set to be compatible with common PC/AT settings. Use the BIOS setup to change some parameters that relate to the serial-communication interface.

### 7.4 ***PS/2 Keyboard/Mouse***

The implementation of the keyboard interface complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

#### **Configuration**

The keyboard uses I/O and IRQ resources. The BIOS allocates the resources during POST configuration. The resources are set to be compatible with common PC/AT settings. Use the BIOS setup to change some keyboard-related parameters.

### 7.5 ***IrDA***

The *ETX-CM* is capable of IrDA SIR operation. This feature is implemented in the Winbond W83627HF Super I/O device. Contact technical support for help with this feature.

### 7.6 ***Parallel Port***

The parallel-communication interface shares signals with the floppy-disk interface. The implementation of this parallel port complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

#### **Configuration**

The parallel-communication interface uses I/O, IRQ, and DMA resources. The resources are allocated by BIOS during POST configuration and are set to be compatible with common PC/AT settings. You can change some parameters of the parallel-communication interface through the BIOS setup.

## 7.7 **Floppy**

The floppy-disk interface shares signals with the parallel-communication interface. The floppy interface is limited to one drive (drive\_1). A standard floppy cable has two connectors for floppy drives. One connector has a non-twisted cable leading to it; the other has a twisted cable leading to it. When using the floppy interface, you must connect the floppy drive to the connector (drive\_1) that has the non-twisted cable leading to it.

The implementation of this subsystem complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

### **Configuration**

The floppy-disk controller uses I/O, IRQ, and (in some modes) direct memory access (DMA) resources. These resources are allocated by BIOS during POST configuration and are set to be compatible with common PC/AT settings. You can change some parameters of the parallel-communication interface through the BIOS setup.

## 8. CONNECTOR X4 SUBSYSTEMS

### 8.1 *IDE Ports*

The implementation of this subsystem complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to those documents for additional information.

#### **Configuration**

Primary and secondary IDE host adapters are PCI bus devices. The BIOS configures them during PCI device configuration. You can disable them by using the BIOS setup. Resources used by the primary and secondary IDE host adapters are compatible with the PC/AT.

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**Note:** Award BIOS will not recognize a Slave device on an IDE port if there is no Master device connected to the same IDE port.

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### 8.2 *Ethernet*

- 10BASE-T/100BASE-T LAN Controller integrated in ICH

The ICH4's integrated LAN controller includes a 32-bit PCI controller that provides enhanced scatter-gather bus mastering capabilities and enables the LAN controller to perform high-speed data transfers over the PCI bus. Its bus master capabilities enable the component to process high level commands and perform multiple operations, which lowers processor utilization by offloading communication tasks from the processor. Two large transmit and receive FIFOs of 3 KB each help prevent data underruns and overruns while waiting for bus accesses. This enables the integrated LAN controller to transmit data with minimum interframe spacing (IFS).

The ICH4 integrated LAN controller can operate in either full-duplex or half-duplex mode. In full-duplex mode the LAN controller adheres with the IEEE 802.3x Flow Control specification. Half duplex performance is enhanced by a proprietary collision reduction mechanism.

- Intel® 82562GT 10/100 Mbps Platform LAN Connect

The 82562GT is a highly-integrated device designed for 10 or 100 Mbps Ethernet systems. It is based on IEEE 10BASE-T and 100BASE-TX standards. The IEEE 802.3u standard for 100BASE-TX defines networking over two pairs of Category 5 unshielded twisted pair cable or Type 1 shielded twisted pair cable. They are also 3.3 V devices available in a 48-pin Shrink Small Outline Package (SSOP).



The 82562GT complies with the IEEE 802.3u Auto-Negotiation standard and the IEEE 802.3x Full Duplex Flow Control standard. The 82562G/GT and 82562ET/EM also include a PHY interface compliant to the current platform LAN connect interface. Go to the Intel website to obtain the latest drivers.

## Configuration

The Ethernet interface is a PCI device. The BIOS setup automatically configures it.

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**Note:** The Ethernet interface works according to the common criteria of the embedded technology market segment.

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### 8.3 ***Power Control***

#### 16. **Power Good / Reset Input**

The *ETX-CM* provides an external input for a power good signal or a manual reset pushbutton. The implementation of this subsystem complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to those documents for additional information.

### 8.4 ***Power Management***

#### 17. **ATX PS Control**

The *ETX-CM* can control the main power output of an ATX-style power supply. The implementation of this subsystem complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

#### 18. **External SMI Interrupt**

Contact technical support for information on this feature.

### 8.5 ***Miscellaneous Circuits***

#### 19. **Speaker**

The implementation of the speaker output complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

## **20. Battery**

The implementation of the battery input complies with the *ETX Specification*. Implementation information is provided in the *ETX Design Guide*. Refer to the documentation for additional information.

In compliance with EN60950, on the *ETX-CM*, there are at least two current-limiting devices (resistor and diode) between the battery and the consuming component.

## **21. I<sup>2</sup>C Bus**

The *ETX-CM* provides a software-driven I<sup>2</sup>C port to communicate with external I<sup>2</sup>C slave devices. This port is implemented on ETX Pins I2DAT and I2CLK.

## 9. SPECIAL FEATURES

### 9.1 *Watchdog Timer*

This feature is implemented in the Fintek F75111R Low Power GPIO device. You can configure the Watchdog Timer (WDT) from the BIOS setup to start after a set amount of time after power-on boot. The application software should strobe the WDT to prevent its timeout. Upon timeout, the WDT resets and restarts the system. This provides a way to recover from program crashes or lockups.

#### **Configuration**

The ETX-CM implements a two-stage watchdog timer on the Fintek F75111R Low Power GPIO device:

- Timer 1 has a range of 0 to 127 seconds and triggers NMI.
- Timer 2 has a range of 0 to 256 seconds or minutes and triggers Reset.

Contact technical support for information on programming and operating the WDT.

## 10. DESIGN CONSIDERATIONS

### 10.1 *Thermal Management*

A heat-spreader assembly is available for the *ETX-CM*. The heat-spreader plate on top of this assembly is NOT a heat sink. It works as an ETX-standard thermal interface to use with a heat sink or other cooling device.

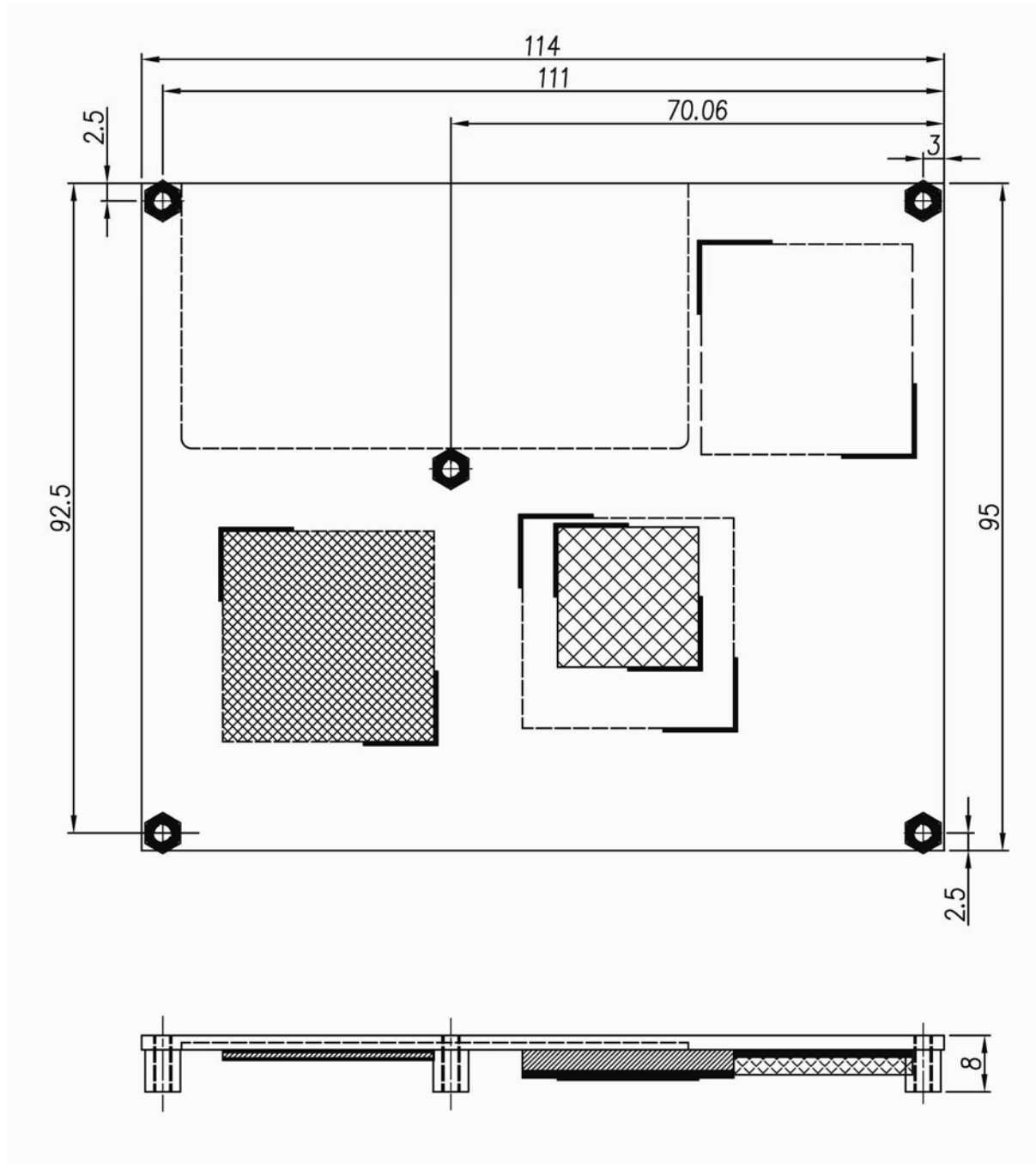
External cooling must be provided to maintain the heat-spreader plate at proper operating temperatures. Under worst-case conditions, the cooling mechanism must maintain an ambient air and heatspreader plate temperature of 60° C or less.

The aluminum slugs and thermal pads on the underside of the heat-spreader assembly implement thermal interfaces between the heatspreader plate and the major heat-generating components on the *ETX-CM*. About 80 percent of the power dissipated within the module is conducted to the heat-spreader plate and can be removed by the cooling solution.

The total power consumption of the ETX-CM is 25 watts at Full On and 14 watts at Idle (Celeron® M 1.3GHz with 256 MB DDR333 – see Section 3.3 Electrical Specifications). Design the cooling solution accordingly.

You can use many thermal-management solutions with the heat-spreader plates, including active and passive approaches. The optimum cooling solution varies, depending on the ETX application and environmental conditions. Please see the *ETX Design Guide* for further information on thermal management.

## 10.2 Threaded Heatspreader Dimensions



## 11. APPENDIX A: SYSTEM RESOURCES

### 11.1 *Interrupt Request (IRQ) Lines*

IRQ #	Used For	Comment
0	Timer0	
1	keyboard controller	
2	Cascade	
3	COM2	Note (1)
4	COM1	Note (1)
5	Sound	Note (1)
6	Floppy disk controller	Note (1)
7	LPT1	Note (1)
8	Real Time Clock	
9	free	
10	COM3	Note (2)
11	COM4	Note (2)
12	PS/2 Mouse	Note (1)
13	Floating point unit (FPU / NPU / Math coprocessor)	
14	Primary IDE channel	Note (1)
15	Secondary IDE channel	Note (1)

**Notes:**<sup>1</sup> If the "Used For" device is disabled in setup, the corresponding interrupt is available for other devices.

<sup>2</sup> Only available if the baseboard is equipped with I/O controller SMC FDC37C669. Note (1) also applies.

### 11.2 *Direct Memory Access (DMA) Channels*

DMA #	Used for	Available	Comment
0		Yes	
1	Sound	No	Note (1)
2	FDC	No	Note (1)
3	LPT	No	Unavailable if LPT used in ECP mode.
4	Cascade	No	
5	Sound	No	Note (1)
6		Yes	
7		Yes	

**Note:** If the "Used For" device is disabled in setup, the corresponding interrupt is available for other devices.

## 11.3 Memory Area

Upper Memory	Used for	Comment
C0000h - CFFFFh	VGA BIOS	
D0000h - DFFFFh	USB	Available if USB Legacy Support is disabled in BIOS setup
E0000h - FFFFFh	System BIOS	

## 11.4 I/O Address Map

The I/O-port addresses of the *ETX-CM* are functionally identical with a standard PC/AT.

The following I/O ports are used:

I/O Address	Used for	Comment
00h – 0Fh C0h – DFh	8237DMA Controller	
20h , 21h	8259A PIC	
2Eh, 2Fh	SuperIO Access Port	
A0h, A1h	8259A PIC	
40h – 43h (XT/AT) 44h – 47h (PS/2)	8254PIT	
60h – 64h	KeyBoard Controller	
90h – 96h	PS/2 P OS	
F0h – FFh	Math Co-Processor, X87 Unit	
170h – 177h	Secondary IDE	
1F0h – 1F7h	Primary IDE	
200h – 22Fh	GAME I/O	
220h – 22Fh	Sound Blaster / AD Lib	
295h, 296h	HW Monitor Access Port	
279h , A79h	Plug and Play Configuration Register	
2F8h – 2FFh	COM2	
330h, 331h	MIDI Port	
378h – 37Ah	Parallel Printer Port	
3B0h – 3BFh	MDA / MGA	
3C0h – 3CFh	EGA / VGA	
3D4h – 3D9h	CGA/CRT Register, Controller and Palette Register	
3F0h – 3F7h	Floppy Diskette	
3F6h, 3F7h	Enhanced IDE	
3F8h – 3FFh	COM1	
0CF8h	PCI Configuration Register/Address	
0CFCh	PCI Configuration Register/data	

## 11.5 ***Peripheral Component Interconnect (PCI) Devices***

PCI Device	PCI Interrupt	Comment
Ethernet	INTE	Uses an internal REQ/GNT pair
South Bridge	-	Uses an internal REQ/GNT pair
Slot1	INTA	AD19
Slot2	INTB	AD20
Slot3	INTC	AD21
Slot4	INTD	AD22
ISA Bridge	-	AD23

## 11.6 ***Inter-IC (I<sup>2</sup>C) Bus***

I2C Address	Used For	Comment
2Eh	Super I/O	
9Ch	WatchingDog Timer	
A0h	DDR SO-DIMM	
D2h	Clock Generator	



## 12. APPENDIX B: BIOS OPERATION

### 12.1 *Determining the BIOS Version*

To determine the AwardBIOS version, immediately press the Pause key on your keyboard as soon as you see the following text display in the upper left corner of your screen:

Phoenix - Award BIOS v6.00PG, An Energy Ally  
Copyright 1984-2003, Phoenix Technology, LTD.  
ETX-CM BIOS RX.XX

### 12.2 *Setup Guide*

The AwardBIOS Setup Utility changes system behavior by modifying the BIOS configuration. The setup program uses a number of menus to make changes and turn features on or off.

---

**Note:** Selecting incorrect values may cause system boot failure. To recover, load the Fail-safe values by pressing <F6>. If you are unable to enter BIOS, it might be necessary to "Clear CMOS" to reset these values.

---

## 22. Start Award BIOS Setup Utility

To start the AwardBIOS setup utility, press <del> when the following string appears during bootup.

Press <del> to enter Setup

The Main Menu then appears.

## 12.3 Main Menu

Once you enter the AwardBIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept your choice and enter the sub-menu.

Phoenix - AwardBIOS CMOS Setup Utility	
<ul style="list-style-type: none"><li>➤Standard CMOS Features</li><li>➤Advanced BIOS Features</li><li>➤Advanced Chipset Features</li><li>➤Integrated Peripherals</li><li>➤Power Management Setup</li><li>➤PnP/PCI Configurations</li><li>➤PC Health Status</li></ul>	<ul style="list-style-type: none"><li>➤Frequency/Voltage Control<ul style="list-style-type: none"><li>Load Fail-Safe Defaults</li><li>Load Optimized Defaults</li><li>Set Supervisor Password</li><li>Set User Password</li><li>Save &amp; Exit Setup</li><li>Exit Without Saving</li></ul></li></ul>
<b>Esc:</b> Quit <span style="float:right">↑↓→←: Select Item</span>	
<b>F10:</b> Save & Exit Setup	
Time, Date, Hard Disk Type....	

---

**Note:** A brief description of each highlighted selection appears at the bottom of the screen.

---

### Setup Items:

The main menu includes the following main setup categories. Recall that some systems may not include all entries. Each category is described in detail in the sections which follow.

- **Standard CMOS Features:**  
Use this menu for basic system configuration.
- **Advanced BIOS Features:**  
Use this menu to set the Advanced Features available on your system.
- **Advanced Chipset Features:**  
Use this menu to change the values in the chipset registers and optimize your system's performance.
- **Integrated Peripherals:**  
Use this menu to specify your settings for integrated peripherals.
- **Power Management Setup:**  
Use this menu to specify your settings for power management.
- **PnP / PCI Configuration:**

This entry appears if your system supports PnP / PCI.

- PC Health Status

This menu displays the current CPU temperature, the fan speeds, voltages etc.

- Frequency/Voltage Control

This setup page controls the CPU clock and frequency ratio.

- Load Fail-Safe Defaults:

Use this menu to load the BIOS default values for the minimal/stable performance required for your system to operate.

- Load Optimized Defaults:

Use this menu to load the BIOS default values that are factory settings for optimal performance and system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

- Supervisor / User Password:

Use this menu to set User and Supervisor Passwords.

- Save & Exit Setup:

Save CMOS value changes to CMOS and exit setup.

- Exit Without Save:

Abandon all CMOS value changes and exit setup.

## 12.4 *Standard CMOS Features*

The items in the Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more setup items. Use the arrow keys to highlight the item and <PgUp> or <PgDn> keys to select the value you want for each item. Note the “Halt On” option which allows you to select the situation in which you want the BIOS to stop the POST process and notify you.

Phoenix - AwardBIOS CMOS Setup Utility		
Standard CMOS Features		
Date (mm:dd:yy):	Mon, <b>Mar</b> 6 2006	Item Help
Time (hh:mm:ss):	16:19:20	
➤ IDE Primary Master	[13579 MB]	Menu Level ➤  Change the day, month, year and century
➤ IDE Primary Slave	[None]	
➤ IDE Secondary Master	[None]	
➤ IDE Secondary Slave	[None]	
Drive A	[1.44M, 3.5 in.]	
Video	[EGA/VGA]	
Halt On	[All Errors]	
Based Memory	640K	
Extended Memory	515072K	
Total Memory	516096K	
↑↓→← Move <b>Enter</b> : Select <b>+/-/PU/PD</b> : Value <b>F10</b> : Save <b>ESC</b> : Exit <b>F1</b> : General Help <b>F5</b> : Previous Values <b>F6</b> : Fail-safe defaults <b>F7</b> : Optimized Defaults		

- **Date:**  
Options- Month/DD/YYYY  
Set the system date. Note that the 'Day' automatically changes when you set the date.
- **Time:**  
Options- HH : MM : SS  
Set the system time.
- **IDE Primary/Secondary Master:**  
Options are available in the sub-menu (described in the IDE Adapters section below)  
Press <Enter> to enter the sub-menu and select detailed options.
- **IDE Primary/Secondary Slave:**  
Options are available in the sub-menu (described in the IDE Adapters section below)  
Press <Enter> to enter the sub-menu and select detailed options.
- **Drive A:**

Options- None/360K, 5.25 in/1.2M, 5.25 in/720K, 3.5 in/1.44M, 3.5 in/2.88M, 3.5 in

Select the type of floppy disk drive installed in your system.

- Video:

Options- EGA/VGA/CGA 40/CGA 80/MONO

Select the default video device.

- Halt On:

Options- All Errors/No Errors/All, but Keyboard/All, but Diskette/All, but Disk/Key

Select the situation in which you want the BIOS to stop the POST process and notify you.

- Base Memory:

Options- N/A

Displays the amount of conventional memory detected during boot up.

- Extended Memory:

Options- N/A

Displays the amount of extended memory detected during boot up.

- Total Memory:

Options- N/A

Displays the total memory available on the system.

## IDE Adapters

The IDE adapters control the hard disk drive. Use a separate sub-menu to configure each hard disk drive.

Phoenix - AwardBIOS CMOS Setup Utility		
IDE Primary Master		
IDE HDD Auto-Detection	[Press Enter]	Item Help
IDE Primary Master Access Mode	[Auto] [Auto]	Menu Level >>
Capacity	13579 MB	To auto-detect the HDD's size, head... on this channel
Cylinder	26310	
Head	16	
Precomp	0	
Landing Zone	26309	
Sector	63	
↑↓→←Move Enter: Select +/-PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

- IDE HDD Auto-Detection:  
Options- Press Enter  
Press Enter to auto-detect the HDD on this channel. If detection is successful, the utility will fill the remaining fields on this menu.
- IDE Primary Master:  
Options- None, Auto and Manual  
Selecting "Manual" lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=20335 means NONE!
- Access Mode:  
Options- CHS, LBA, Large and Auto  
Choose the access mode for this hard disk
- Capacity:  
Options- Auto Display your disk drive size  
Disk drive capacity (approximate). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.

**\*The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'**

- Cylinder:  
Options- Min = 0, Max = 20335  
Set the number of cylinders for this hard disk.
- Head:  
Options- Min = 0, Max = 255  
Set the number of read/write heads.
- Precomp:  
Options- Min = 0, Max = 20335  
\*\*\*\* Warning: Setting a value of 20335 means no hard disk!
- Landing zone:  
Options- Min = 0, Max = 20335
- Sector:  
Options- Min = 0, Max = 255  
Number of sectors per track

## 12.5 *Advanced BIOS Features*

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

Phoenix - AwardBIOS CMOS Setup Utility		
Advanced BIOS Features		
Virus Warning	[Disabled]	Item Help <hr/> Menu Level ➤
Quick Power On Self Test	[Enabled]	
First Boot Device	[CDROM]	
Second Boot Device	[HDD-0]	
Third Boot Device	[USB-HDD]	
Boot Other Device	[Enabled]	
Boot Up Floppy Seek	[Disabled]	
Boot Up NumLock Status	[On]	
Gate A20 Option	[Fast]	
Typematic Rate Setting	[Disabled]	
x Typematic Rate (Chars/Sec)	6	
x Typematic Delay (Msec)	250	
Security Option	[Setup]	
APIC Mode	[Enabled]	
Small Logo(EPA) Show	[Disabled]	
↑↓→←Move Enter: Select +/-/PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

- **Virus Warning:**  
Allows you to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempts to write data into this area, the BIOS will show a warning message on the screen and sound an alarm beep.
  - ♦ Enabled---Activates automatically when the system boots up and causes a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
  - ♦ Disabled---No warning message will appear when anything attempts to access the boot sector or hard disk partition table.
- **Quick Power On Self Test:**  
This option speeds up the Power On Self Test (POST) which runs when you power up the computer. If it is set to Enabled, BIOS will shorten or skip some check items during POST.
  - ♦ Enabled---Enable quick POST
  - ♦ Disabled--- Normal POST



- **First/Second/Third Boot Device:**  
The BIOS will attempt to load the operating system from the devices specified here as the first, second and third boot devices.  
Options-Floppy, LS/ZIP, Hard Disk, CDROM, LAN and Disabled.
- **Boot Other Device:**  
When enabled, the system will search all other possible locations for an operating system if it fails to find one in the devices specified under the first, second, and third boot devices.  
Options- Enabled, Disabled
- **Boot Up Floppy Seek:**  
If enabled, the system will seek for disk drives during boot up. Disabling will speed boot up.  
Options- Enabled, Disabled.
- **Boot Up NumLock Status:**  
Select the power-on state for NumLock.  
Options- On, Off
- **Gate A20 Option:**  
Select if the chipset or the keyboard controller should control GateA20.
  - ♦ Normal---A pin in the keyboard controller controls GateA20
  - ♦ Fast---Lets the chipset control GateA20
- **Typematic Rate Setting**  
Manually set the Typematic Rate or the Typematic Delay.
- **Typematic Rate (Chars/Sec)**  
The highest number of characters that can be typed in a second on the keyboard.
- **Typematic Delay (Msec)**  
The time (in milliseconds) needed before pressing again a key on the keyboard.

- Security Option:

Select whether a password is required every time the system boots or only when you enter setup.

- ♦ System---The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
- ♦ Setup---The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: To disable security, select PASSWORD SETTING at the Main Menu. You will be asked to enter password. Do not type anything and just press <Enter> to disable security. Once security is disabled, the system will boot and you can enter Setup freely.

- APIC MODE

Selecting Enabled enables APIC device mode reporting from the BIOS to the operating system.

Options- Enabled, Disabled.

- Small Logo (EPA) Show:

This field enables the showing of the EPA logo located at the upper right of the screen during boot up.

Options- Enabled, Disabled.

## 12.6 Advanced Chipset Features

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. Please note that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

Phoenix - AwardBIOS CMOS Setup Utility		
Advanced Chipset Features		
DRAM Timing Selectable [By SPD] x CAS Latency Time [2.5] x Active to Precharge Delay [7] x DRAM RAS# To CAS# Delay [3] x DRAM RAS# Precharge [3] x DRAM Data Integrity Mode [Non-ECC] MGM Core Frequency Auto Max 400/333MHz System BIOS Cacheable [Enabled] Video BIOS Cacheable [Disabled] Memory Hole At 15M-16M [Disabled] Delayed Transaction [Enabled] Delay Prior to Thermal [16 Min] AGP Aperture Size (MB) [64]  ** On-Chip VGA Setting ** On-Chip VGA [Enabled] On-Chip Frame Buffer Size [32MB] Boot Display [CRT] LVDS Resolution [800 X 600]		Item Help <hr/> Menu Level ➤
↑↓→← Move <b>Enter</b> : Select <b>+/-/PU/PD</b> : Value <b>F10</b> : Save <b>ESC</b> : Exit <b>F1</b> : General Help <b>F5</b> : Previous Values <b>F6</b> : Fail-safe defaults <b>F7</b> : Optimized Defaults		

- DRAM Timing Selectable:

This selection provides the option to select DRAM timing detection using Serial Presence Detect (SPD) or by manually setting it.  
Options- Manual, By SPD.

- CAS Latency Time:

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing.  
Options- 2, 2.5.

- **Active to Precharge Delay**  
This option selects the active to precharge delay.  
Options- 5, 6, 7.
- **DRAM RAS# To CAS# Delay:**  
This option allows you to insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. Fast gives faster performance; and Slow gives more stable performance. This option applies only when synchronous DRAM is installed in the system.  
Options- 2, 3.
- **DRAM RAS# Precharge:**  
If an insufficient number of cycles are allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain data. Fast gives faster performance; and Slow gives more stable performance. This option applies only when synchronous DRAM is installed in the system.  
Options- 2, 3.
- **DRAM Data Integrity Mode:**  
This option enables/disables the DRAM ECC integrity mode.  
Options- Non-ECC, ECC.
- **MGM Core Frequency**  
This field sets the frequency of the DRAM memory installed. The default setting is Auto Max 400/333MHz.
- **System BIOS Cacheable:**  
Selecting "Enabled" allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.  
Options- Enabled, Disabled.
- **Video BIOS Cacheable:**  
Selecting "Enabled" allows caching of the video BIOS, resulting in better system performance. However, if any program writes to this memory area, a system error may result.  
Options- Enabled, Disabled.

- **Memory Hole At 15M-16M:**  
You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user guides for peripherals that need to use this area of system memory usually discuss their memory requirements. Options- Enabled, Disabled.
- **Delayed Transaction**  
The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.1.
- **Delay Prior to Thermal**  
This field activates the CPU thermal function after the systems boots for the set number of minutes. The options are 4, 8, 16 and 32 Min.
- **AGP Aperture Size (MB):**  
This option determines the effective size of the Graphic Aperture used for a particular GMCH configuration. It can be updated by the GMCH-specific BIOS configuration sequence before the PCI standard bus enumeration sequence takes place. If it is not updated then a default value will select an aperture of maximum size.  
Options- 4, 8, 16, 32, 64, 128 and 256.

#### **\*\* On-Chip VGA Setting\*\***

- **On-Chip VGA**  
Allows you to enable and disable the on-chip VGA.
- **On-Chip Frame Buffer Size:**  
This item allows you to control the on-chip frame buffer size.  
Options- 1M, 4M, 8M, 16M and 32M.
- **Boot Display**  
The default setting is CRT. Other options are: LVDS, CRT+LVDS, DVI, TV, and CRT+DVI
- **LVDS Resolution**  
The default setting is 800 X 600. Other options are: 1024 X 768, 1280 X 1024, 1400 X 1050, and 1600 X 1200.

## 12.7 Integrated Peripherals

Phoenix - AwardBIOS CMOS Setup Utility

### Integrated Peripherals

<ul style="list-style-type: none"> <li>➤ OnChip IDE Device [Press Enter]</li> <li>➤ Onboard Device [Press Enter]</li> <li>➤ SuperIO Device [Press Enter]</li> <li>➤ Console Redirection [Press Enter]</li> </ul>	<div>Item Help</div> <hr/> <div>Menu Level ➤</div>
↑↓→← Move <b>Enter</b> : Select <b>+/-/PU/PD</b> : Value <b>F10</b> : Save <b>ESC</b> : Exit <b>F1</b> : General Help <b>F5</b> : Previous Values <b>F6</b> : Fail-safe defaults <b>F7</b> : Optimized Defaults	

### OnChip IDE Device:

#### OnChip IDE Device

On-Chip Primary PCI IDE [Enabled] IDE Primary Master PIO [Auto] IDE Primary Slave PIO [Auto] IDE Primary Master UDMA [Auto] IDE Primary Slave UDMA [Auto] On-Chip Secondary PCI IDE [Enabled] IDE Secondary Master PIO [Auto] IDE Secondary Slave PIO [Auto] IDE Secondary Master UDMA [Auto] IDE Secondary Slave UDMA [Auto]  IDE HDD Block Mode [Enabled]	<div>Item Help</div> <hr/> <div>Menu Level ➤</div>
↑↓→← Move <b>Enter</b> : Select <b>+/-/PU/PD</b> : Value <b>F10</b> : Save <b>ESC</b> : Exit <b>F1</b> : General Help <b>F5</b> : Previous Values <b>F6</b> : Fail-safe defaults <b>F7</b> : Optimized Defaults	

- OnChip Primary/Secondary PCI IDE:

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select "Enabled" to activate each channel separately.

Options- Enabled, Disabled.

- IDE Primary/Secondary Master/Slave PIO:

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

Options- Auto, Mode 0, Mode 1, Mode 2, Mode 3 and Mode 4.

#### ➤ IDE Primary/Secondary Master/Slave UDMA:

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select "Auto" to enable BIOS support.

Options- Auto, Disabled.

## Onboard Device

Onboard Device		
USB Controller	[Enabled]	<div>Item Help</div> <hr/> <div>Menu Level ➤</div>
USB 2.0 Controller	[Enabled]	
USB Keyboard Support	[Enabled]	
USB Mouse Support	[Enabled]	
AC97 Audio	[Auto]	
Init Display First	[Onboard/AGP]	
<div>⬆⬇⬇⬆⬇⬇⬆⬇</div>		

- USB / USB 2.0 Controller:**  
 Select "Enabled" if your system contains a Universal Serial Bus (USB) / USB 2.0 controller and you have USB peripherals.  
 Options- Enabled, Disabled.
- USB Keyboard Support:**  
 Select "Enabled" if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.  
 Options- Enabled, Disabled.
- USB Mouse Support:**  
 Select "Enabled" if your system contains a Universal Serial Bus (USB) controller and you have a USB mouse.  
 Options- Enabled, Disabled.
- AC'97 Audio:**  
 This item allows you to decide to auto or disable the chipset family to support AC'97 Audio.  
 Options- Auto, Disabled.
- Init Display First:**  
 This item allows you to decide to whether to activate the PCI Slot or Onboard/AGP VGA first.  
 Options- PCI Slot, Onboard/AGP.

## SuperIO Device

SuperIO Device		
Onboard FDC Controller	[Enabled]	<div>Item Help</div> <hr/> <div>Menu Level ➤</div>
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	
UART Mode Select	[Normal]	
RxD , TxD Active	[Hi,Lo]	
IR Transmission Delay	[Enabled]	
UR2 Duplex Mode	[Half]	
Use IR Pins	[IR-Rx2Tx2]	
FDD / LPT Select	[378/IRQ7]	
Parallel Port Mode	[SPP]	
EPP Mode Select	[EPP1.7]	
ECP Mode Use DMA	[3]	
Game Port Address	[201]	
Midi Port Address	[330]	
Midi Port IRQ	[10]	
↑↓→←Move <b>Enter</b> : Select <b>+/-/PU/PD</b> : Value <b>F10</b> : Save <b>ESC</b> : Exit <b>F1</b> : General Help <b>F5</b> : Previous Values <b>F6</b> : Fail-safe defaults <b>F7</b> : Optimized Defaults		

- **Onboard FDC Controller:**

Select "Enabled" if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you have installed an add-in FDC or the system has no floppy drive, select Disabled.

Options- Enabled, Disabled.

- **Onboard Serial Port 1/Port 2:**

Select an address and corresponding interrupt for the first and second serial ports.

Options- Disabled , 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3, and Auto.

- **UART Mode Select:**

This item allows you to select the UART mode.

Options- IrDA, ASKIR and Normal.

- **Parallel Port Mode**

This field allows you to determine parallel port mode function.

Options- SPP, EPP ECP, EPP + ECP and Normal.



## Console Redirection

Console Redirection		Item Help
Console Redirection	[Enabled]	<hr/> Menu Level ➤  Enabled - Attempt to redirect console via COM port  Disabled – Disable console redirection
Baud Rate	[19200]	
Agent Connect via	[NULL]	
Agent wait time(min)	[1]	
Agent after boot	[Disabled]]	
↑↓→←Move <b>Enter</b> : Select <b>+/-/PU/PD</b> : Value <b>F10</b> : Save <b>ESC</b> : Exit <b>F1</b> : General Help <b>F5</b> : Previous Values <b>F6</b> : Fail-safe defaults <b>F7</b> : Optimized Defaults		

- Console Redirection:  
Select "Enabled" to attempt to redirect console via COM port.  
Select "Disabled" to disable console redirection.
- Baud Rate:  
Specify Baud Rate of console redirection.  
Options- 9600, 19200, 38400, 57600, and 115200.
- Agent wait time:  
Set the timeout for the connection.  
Options- 1, 2, 4, and 8 Min.
- Agent after boot:  
This setting determines whether to keep the connection running after OS boot.  
Options- Enabled, Disabled.

## 12.8 **Power Management Setup**

The Power Management Setup allows you to configure your system to most effectively save energy while operating in a manner consistent with your own style of computer use.

Phoenix - AwardBIOS CMOS Setup Utility  
Power Management Setup

ACPI Function	[Enabled]	Item Help
Power Management	[Min Saving]	
Video Off Method	DPMS]	
Video Off In Suspend	[Yes]	Menu Level ➤
Suspend Type	[Stop Grant]	
Modem Use IRQ	[3]	
Suspend Mode	1 Hour	
HDD Power Down	15 Min	
Soft-Off by PWR-BTTN	[Instant-Off]	
PWRON After PWR-Fail	[Former-Sts]	
CPU THRM-Throttling	[50.0%]	
Power On by Ring	[Enabled]	
Resume by Alarm	[Disabled]	
x Date(or Month) Alarm	0	
x Time(hh:mm:ss) Alarm	0 : 0 : 0	

↑↓→←-Move   **Enter**: Select   **+/-/PU/PD**: Value   **F10**: Save   **ESC**: Exit   **F1**: General Help  
**F5**: Previous Values   **F6**: Fail-safe defaults   **F7**: Optimized Defaults

- **ACPI Function:**

This item allows you to enable or disable the Advanced Configuration and Power Management(ACI).

Options- Enabled, Disabled.

- **Power Management:**

This item allows you to select the type (or degree) of power saving and is directly related to the following settings: HDD Power Down, Suspend Mode (see next page).

**Min. Power Saving:**

Minimum power management. Suspend Mode = 1 hr., and HDD Power Down = 15 min.

**Max. Power Saving:**

Maximum power management -- Suspend Mode = 1 min., and HDD Power Down = 1 min.

**User Defined:**

Allows you to set Suspend Mode and HDD Power Down individually. Suspend Mode ranges from disabled to 1 hr., and HDD Power Down ranges from disabled to 15 min.

- **Video Off Method:**

This determines the manner in which the monitor is blanked.

- ♦ Blank Screen: This option only writes blanks to the video buffer.
- ♦ V/H SYNC+Blank: This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
- ♦ DPMS: Initial display power management signaling.

- **Video Off In Suspend:**

This determines the manner in which the monitor is blanked.

Options- Yes, No.

- **Suspend Type:**

Select the Suspend Type.

Options- PWRON Suspend, Stop Grant.

- **Modem Use IRQ:**

This determines the IRQ, which can be applied in MODEM use.

3 (default)/ 4 / 5 / 7 / 9 / 10 / 11 / NA.

- **Suspend Mode:**

When enabled and a set time of system inactivity has elapsed, all devices except the CPU will be shut off (see Power Management on previous page).

- **HDD Power Down:**

When enabled and a set time of system inactivity has elapsed, the hard disk drive will be powered down while all other devices remain active (see Power Management on previous page).

Options- Enabled, Disabled.

- **Soft-Off by PWR-BTTN:**

Configures the power button function:

- ♦ Instant-Off: The power button functions as a normal power-on/-off button.
- ♦ Delay 4 Sec: The system is turned off if the power button is pressed for more than four seconds.

- **PWRON After PWR-Fail:**

Allows you to set the the “Power On After Power Fail” function.

Options- Former-Status, On, Off

- **CPU THRM-Throttling:**

Allows you to set the amount of CPU THRM-Throttling.

Options- 87.5%, 75.0%, 62.5%, 50.0% (default), 37.5%, 25.0%, 12.5%

- **Power On by Ring:**

This field enables or disables powering on of the system through a modem connected to the serial port.

Options- Enabled, Disabled.

- **Resume by Alarm:**

When “Enabled”, your can set the date and time at which the RTC (real-time clock) alarm awakens the system from Suspend mode.

Options- Enabled, Disabled.

- **Date (or Month) Alarm:**

Select a date in the month when you want the alarm to go off.

Set the time you want the alarm to go off

- **Time (hh:mm:ss) Alarm:**

Set the time you want the alarm to go off

## 12.9 PnP/PCI Configurations

This section describes the configuration of the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users make any changes to the default settings.

Phoenix - AwardBIOS CMOS Setup Utility  
PnP/PCI Configurations

PNP OS Installed	[Yes]	Item Help
Reset Configuration Data	[Disabled]	
Resources Controlled By	[Auto (ESCD)]	Menu Level ➤
x IRQ Resources	Press Enter	Select Yes if you are using a Plug and Play capable operating system. Select No if you need the BIOS to configure non-boot devices.
x DMA Resources	Press Enter	
<div>↑↓→← Move   Enter: Select   +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help F5: Previous Values   F6: Fail-safe defaults   F7: Optimized Defaults</div>		

- **PNP OS Installed**

Enable the PNP OS Install option if it is supported by the operating system.

- **Reset Configuration Data:**

Normally, you leave this field Disabled. Select "Enabled" to reset the Extended System Configuration Data (ESCD) when you exit Setup and you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

Options- Enabled, Disabled.

- **Resources Controlled By:**

This item allows you to automatically configure all the boot- and Plug and Play-compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields are cleared, as the BIOS automatically assigns them.

## 12.10 *PC Health Status*

Phoenix - AwardBIOS CMOS Setup Utility

### PC Health Status

CPU Warning Temperature	[Disabled]	Item Help
SYS Temperature	24°C / 75°F	
CPU Temperature	36°C / 96°F	
VCore	0.92V	Menu Level ➤
VCCP	1.05V	
+3.3 V	3.39V	
+5 V	5.13V	
5VSB (V)	4.96V	
Shutdown Temperature	[Disabled]	
↑↓→←Move Enter: Select +/-PU/PD: Value F10: Save ESC: Exit F1: General Help F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

- **CPU Warning Temperature:**

This field allows the user to set the temperature so that when the temperature is reached, the system sounds a warning. This function can help prevent damage to the system that is caused by overheating.

Options: Disabled , 50°C/122°F, 53°C/127°F, 56°C/133°F, 60°C/140°F, 63°C/145°F, 66°C/151°F, and 70°C/158°F.

- **SYS/CPU Temperature:**

Shows the current System/CPU temperature.

- **VCore/VCCP/3.3V/+5V/12V/ 5VSB:**

Detect the system's voltage status automatically.

- **Shutdown Temperature:**

This item allows you to set up the CPU shutdown Temperature.

Options- Disabled, 60°C / 140°F, 65°C / 149°F, 70°C / 150°F and 75°C / 167°F.

## 12.11 *Frequency/Voltage Control*

Phoenix - AwardBIOS CMOS Setup Utility

Auto Detect PCI CLK	Enabled	Item Help
Spread Spectrum Modulated	Disabled	
		Menu Level >
↑↓→←Move Enter: Select +/-PU/PD: Value F10: Save ESC: Exit F1: General Help		
F5: Previous Values F6: Fail-safe defaults F7: Optimized Defaults		

Frequency/Voltage Control

- **Auto Detect PCI CLK:**

When "Enabled", this item will auto detect if the PCI slot has any devices and will send the clock signal to the PCI devices. When disabled, it will send the clock signal to the PCI slot.

Options- Enabled, Disabled.

- **Spread Spectrum Modulated:**

This item allows you to enable or disable the Spread Spectrum Modulated function.

Options- Disabled, Enabled.

## 12.12 *Load Fail-Safe Defaults*

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N)? N

Pressing 'Y' loads the BIOS default values for the most stable, minimal-performance system operation.

## 12.13 *Load Optimized Defaults*

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N)? N

Pressing 'Y' loads the default values which are the factory settings for optimal-performance system operation.



## 12.14 ***Supervisor/User Password Setting***

You can set either the supervisor or the user password, or both. The differences between them are:

**Supervisor:** is allowed to enter Setup and change the options.

**User:** is allowed to enter Setup but not to change the options.

When you select either function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD:

Type the new password, up to eight characters in length, and press <Enter>. The new password will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the change.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that password protection will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration. Additionally, when you have enabled a password, you can also require the BIOS to request the password every time your system is rebooted. This would prevent unauthorized use of your computer.

You can determine when the password is requested in the BIOS Features Setup Menu and its Security option (see above). If the Security option is set to "System", a password will be required both at boot and on entry into Setup. If set to "Setup", a password is required only when trying to enter Setup.

## 12.15 ***Exit Selection***

- **Save & Exit Setup**

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections you made in CMOS - a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values, the system is restarted.

- **Exit Without Saving**

Pressing <Enter> on this item asks for confirmation:

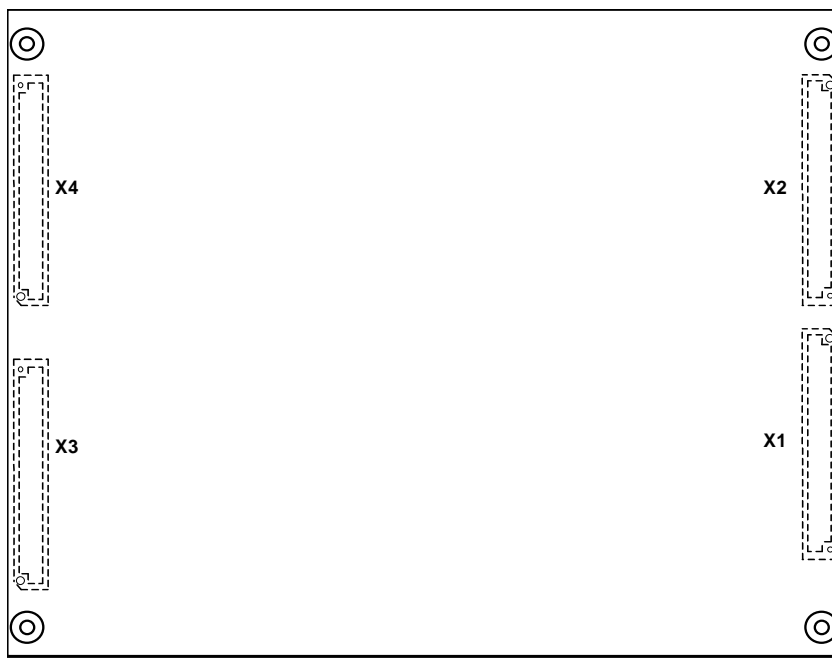
Quit without saving (Y/N)? Y

This allows you to exit Setup without storing any changes in CMOS. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

## 13. APPENDIX C: ETX CONNECTOR PINOUTS

The pinouts for ETX Interface Connectors X1, X2, X3, and X4 are documented for convenient reference. Please see the *ETX Specification* and *ETX Design Guide* for detailed, design-level information.

### 13.1 Connector Locations



**top view**  
(connectors only)



**side view**  
(connectors only)

## 13.2 Connector X1 (PCI Bus, USB, Audio)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC *	52	VCC *
3	PCICLK3	4	PCICLK4	53	PAR	54	SERR#
5	GND	6	GND	55	GPERR#	56	RESERVED
7	PCICLK1	8	PCICLK2	57	PME#	58	USB2#
9	REQ3#	10	GNT3#	59	LOCK#	60	DEVSEL#
11	GNT2#	12	3V	61	TRDY#	62	USB3#
13	REQ2#	14	GNT1#	63	IRDY#	64	STOP#
15	REQ1#	16	3V	65	FRAME#	66	USB2
17	GNT0#	18	RESERVED	67	GND	68	GND
19	VCC	20	VCC	69	AD16	70	CBE2#
21	SERIRQ	22	REQ0#	71	AD17	72	USB3
23	AD0	24	3V	73	AD19	74	AD18
25	AD1	26	AD2	75	AD20	76	USB0#
27	AD4	28	AD3	77	AD22	78	AD21
29	AD6	30	AD5	79	AD23	80	USB1#
31	CBE0#	32	AD7	81	AD24	82	CBE3#
33	AD8	34	AD9	83	VCC *	84	VCC *
35	GND	36	GND	85	AD25	86	AD26
37	AD10	38	AUXAL	87	AD28	88	USB0
39	AD11	40	MIC	89	AD27	90	AD29
41	AD12	42	AUXAR	91	AD30	92	USB1
43	AD13	44	ASVCC	93	PCIRST#	94	AD31
45	AD14	46	SNDL	95	INTC#	96	INTD#
47	AD15	48	ASGND	97	INTA#	98	INTB#
49	CBE1#	50	SNDR	99	GND	100	GND

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**Notes:** \* To protect external power lines of peripheral devices, make sure that:

- The wires have the right diameter to withstand the maximum available current
- The enclosure of the peripheral device fulfils the fire-protection requirements of IEC/EN60950

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### 13.3 Connector X2 (ISA Bus)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC *	52	VCC *
3	SD14	4	SD15	53	SA6	54	IRQ5
5	SD13	6	MASTER#	55	SA7	56	IRQ6
7	SD12	8	DREQ7	57	SA8	58	IRQ7
9	SD11	10	DACK7#	59	SA9	60	SYSCLK
11	SD10	12	DREQ6	61	SA10	62	REFSH#
13	SD9	14	DACK6#	63	SA11	64	DREQ1
15	SD8	16	DREQ5	65	SA12	66	DACK1#
17	MEMW#	18	DACK5#	67	GND	68	GND
19	MEMR#	20	DREQ0	69	SA13	70	DREQ3
21	LA17	22	DACK0#	71	SA14	72	DACK3#
23	LA18	24	IRQ14	73	SA15	74	IOR#
25	LA19	26	IRQ15	75	SA16	76	IOW#
27	LA20	28	IRQ12	77	SA18	78	SA17
29	LA21	30	IRQ11	79	SA19	80	SMEMR#
31	LA22	32	IRQ10	81	IOCHRDY	82	AEN
33	LA23	34	IO16#	83	VCC *	84	VCC *
35	GND	36	GND	85	SD0	86	SMEMW#
37	SBHE#	38	M16#	87	SD2	88	SD1
39	SA0	40	OSC	89	SD3	90	NOWS#
41	SA1	42	BALE	91	DREQ2	92	SD4
43	SA2	44	TC	93	SD5	94	IRQ9
45	SA3	46	DACK2#	95	SD6	96	SD7
47	SA4	48	IRQ3	97	IOCHK#	98	RSTDRV
49	SA5	50	IRQ4	99	GND	100	GND

---

**Notes:** \* To protect external power lines of peripheral devices, make sure that:

- The wires have the right diameter to withstand the maximum available current
- The enclosure of the peripheral device fulfils the fire-protection requirements of IEC/EN60950

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### 13.4 Connector X3 (VGA, LCD, Video, COM1 and COM2, LPT/Floppy, Mouse, Keyboard)

Pin	Signal	Pin	Signal
1	GND	2	GND
3	R	4	B
5	HSY	6	G
7	VSX	8	DDCK
9	DETECT#	10	DDDA
11	LCDDO16	12	LCDDO18
13	LCDDO17	14	LCDDO19
15	GND	16	GND
17	LCDDO13	18	LCDDO15
19	LCDDO12	20	LCDDO14
21	GND	22	GND
23	LCDDO8	24	LCDDO11
25	LCDDO9	26	LCDDO10
27	GND	28	GND
29	LCDDO4	30	LCDDO7
31	LCDDO5	32	LCDDO6
33	GND	34	GND
35	LCDDO1	36	LCDDO3
37	LCDDO0	38	LCDDO2
39	VCC *	40	VCC *
41	DCC_DAT	42	LTGIO0
43	DCC_CLK	44	BLON#
45	BIASON	46	DIGON
47	COMP	48	Y
49	SYNC	50	C

---

**Notes:** \* To protect external power lines of peripheral devices, make sure that:

- The wires have the right diameter to withstand the maximum available current
- The enclosure of the peripheral device fulfils the fire-protection requirements of IEC/EN60950

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## 23. Parallel Port / Floppy Interfaces

You can configure ETX parallel port interfaces as conventional PC parallel ports or as an interface for a floppy disk drive. You can select the operating mode in the BIOS settings or by a hardware mode select pin.

If pin X3-51 (LPT/FLPY#) is grounded at boot time, the floppy support mode is selected. If the pin is left floating or is held high, parallel-port mode is selected. The mode selection is determined at boot time. It cannot be changed until the next boot cycle.

Parallel Port Mode Pinout				Floppy Support Mode Pinout			
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
51	LPT/FLPY#	52	RESERVED	51	LPT/FLPY#	52	RESERVED
53	VCC *	54	GND	53	VCC *	54	GND
55	STB#	56	AFD#	55	RESERVED	56	DENSEL
57	RESERVED	58	PD7	57	RESERVED	58	RESERVED
59	IRRX	60	ERR#	59	IRRX	60	HDSEL#
61	IRTX	62	PD6	61	IRTX	62	RESERVED
63	RXD2	64	INIT#	63	RXD2	64	DIR#
65	GND	66	GND	65	GND	66	GND
67	RTS2#	68	PD5	67	RTS2#	68	RESERVED
69	DTR2#	70	SLIN#	69	DTR2#	70	STEP#
71	DCD2#	72	PD4	71	DCD2#	72	DSKCHG#
73	DSR2#	74	PD3	73	DSR2#	74	RDATA#
75	CTS2#	76	PD2	75	CTS2#	76	WP#
77	TXD2	78	PD1	77	TXD2	78	TRK0#
79	RI2#	80	PD0	79	RI2#	80	INDEX#
81	VCC *	82	VCC *	81	VCC *	82	VCC *
83	RXD1	84	ACK#	83	RXD1	84	DRV
85	RTS1#	86	BUSY	85	RTS1#	86	MOT
87	DTR1#	88	PE	87	DTR1#	88	WDATA#
89	DCD1#	90	SLCT#	89	DCD1#	90	WGATE#
91	DSR1#	92	MSCLK	91	DSR1#	92	MSCLK
93	CTS1#	94	MSDAT	93	CTS1#	94	MSDAT
95	TXD1	96	KBCLK	95	TXD1	96	KBCLK
97	RI1#	98	KBDAT	97	RI1#	98	KBDAT
99	GND	100	GND	99	GND	100	GND

---

**Notes:** \* To protect external power lines of peripheral devices, make sure that:

- The wires have the right diameter to withstand the maximum available current
- The enclosure of the peripheral device fulfils the fire-protection requirements of IEC/EN60950

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### 13.5 Connector X4 (IDE 1, IDE 2, Ethernet, Miscellaneous)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	SIDE_IOW#	52	PIDE_IOR#
3	5V_SB	4	PWGIN	53	SIDE_DRQ	54	PIDE_IOW#
5	PS_ON	6	SPEAKER	55	SIDE_D15	56	PIDE_DRQ
7	PWRBTN#	8	BATT	57	SIDE_D0	58	PIDE_D15
9	KBINH#	10	LILED#	59	SIDE_D14	60	PIDE_D0
11	RSMRST#	12	ACTLED#	61	SIDE_D1	62	PIDE_D14
13	ROMKBCS#	14	SPEEDLED#	63	SIDE_D13	64	PIDE_D1
15	EXT_PRG	16	I2CLK	65	GND	66	GND
17	VCC *	18	VCC *	67	SIDE_D2	68	PIDE_D13
19	OVCR#	20	GPCS#	69	SIDE_D12	70	PIDE_D2
21	EXTSMI#	22	I2DAT	71	SIDE_D3	72	PIDE_D12
23	SMBCLK	24	SMBDATA	73	SIDE_D11	74	PIDE_D3
25	SIDE_CS3#	26	SMBALRT#	75	SIDE_D4	76	PIDE_D11
27	SIDE_CS1#	28	DASP_S	77	SIDE_D10	78	PIDE_D4
29	SIDE_A2	30	PIDE_CS3#	79	SIDE_D5	80	PIDE_D10
31	SIDE_A0	32	PIDE_CS1#	81	VCC *	82	VCC *
33	GND	34	GND	83	SIDE_D9	84	PIDE_D5
35	PDIAG_S	36	PIDE_A2	85	SIDE_D6	86	PIDE_D9
37	SIDE_A1	38	PIDE_A0	87	SIDE_D8	88	PIDE_D6
39	SIDE_INTRQ	40	PIDE_A1	89	GPE2#	90	CBLID_P
41	BATLOW#	42	GPE1#	91	RXD#	92	PIDE_D8
43	SIDE_AK#	44	PIDE_INTRQ	93	RXD	94	SIDE_D7
45	SIDE_RDY	46	PIDE_AK#	95	TXD#	96	PIDE_D7
47	SIDE_IOR#	48	PIDE_RDY	97	TXD	98	HDRST#
49	VCC *	50	VCC *	99	GND	100	GND

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**Notes:** \* To protect external power lines of peripheral devices, make sure that:

- The wires have the right diameter to withstand the maximum available current
- The enclosure of the peripheral device fulfils the fire-protection requirements of IEC/EN60950.

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### 13.6 DVI Connector

The DVI connector onboard the ETX-CM module is SMD type 20-pin 0.5mm pitch.

Pin	Signal	Pin	Signal
1	+5V	11	TDC2-
2	+5V	12	TDC2+
3	GND	13	GND
4	GND	14	TCL+
5	TDC0-	15	TCL-
6	TDC0+	16	GND
7	GND	17	I2C clock
8	TDC1-	18	I2C data
9	TDC1+	19	GND
10	GND	20	Hot Plug Detect



## 14. APPENDIX D: DOCUMENT-REVISION HISTORY

Revision	Date	Edited by	Changes
1.0	06/02/2006	JC	Initial Release
1.01	06/13/2006	JC	Minor error correction
1.10	07/20/2006	JC	BIOS chapter update, minor corrections
1.11	09/08/2006	JC	Update website information
1.12	12/27/2006	JC	Correct Serial Port information